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SOME RECENT OBSERVATIONS OF NOVA GEMINORUM 2.

Occasional photographs of the spectrum of *Nova Geminorum* taken during the year have shown some interesting changes in the relative intensities of certain of the bright bands. The most important of these is the Rydberg hydrogen line at $\lambda 4687$. As early as May, 1912, this line was fairly bright and well defined. During that summer, however, it must have decreased greatly in brightness, as photographs taken in August and September showed mere traces of it. In November, however, it became bright again and ever since that time it has remained a prominent feature of the spectrum, gradually gaining in intensity. The two nebular bands at about $\lambda 4612$ and $\lambda 4641$ have also fluctuated widely. In April, 1913, the $\lambda 4641$ band was very strong and the $\lambda 4612$ band very weak, while in October the $\lambda 4612$ band was considerably the stronger of the two. The regular hydrogen bands have shown a steady decrease in intensity during the observations and the principal nebular bands have shown an increase.

The most recent photograph, taken on October 12th, shows the nebular bands at $\lambda 5007$ and $\lambda 4364$ as the strongest features of the spectrum and $\lambda 4959$, $\lambda 4687$, and $\lambda 4612$ of about equal intensity, the first being slightly the strongest. The hydrogen lines $H\delta$, $H\gamma$ and $H\beta$ are all comparatively faint. A band near $\lambda 4520$ is nearly as bright as $H\gamma$. These bands, with the nebular band at about $\lambda 4641$, which is somewhat fainter than $\lambda 4687$, are all of the conspicuous features of the spectrum. A very faint continuous spectrum is visible.

All of the bright bands are from 20 to 30 Ångstrom units wide and show absorption lines passing through their centers. This has been a characteristic feature of the Nova spectrum since early in its history.

W. S. ADAMS,

A. KOHLSCHÜTTER.

NEW EQUIPMENT FOR THE CHABOT OBSERVATORY.

On account of the constant increase of electric lights, and the encroachment of high buildings, it has become necessary to move the Chabot Observatory. The matter was urged before the Oakland Board of Education, and it unanimously agreed to move the observatory out of the business section to a favor-

able locality, not yet decided upon; and, also, upon my advice, authorized the purchase of a 20-inch refractor for the new observatory.

The funds left by Mr. Chabot over twenty-five years ago, "to enlarge and add to the equipment of the observatory," is available for removal and new building, while the new telescope will be purchased by the School Department.

CHARLES BURCKHALTER.

OAKLAND, CAL., November, 1913.

RATES OF THE STANDARD CLOCKS AT THE LICK
OBSERVATORY.

There are four clocks in use, keeping sidereal time. The Riefler clock case was closed in April, following the rating of the clock in the new case. Its mean rate for about five months has been $-0^s.25$ at temperature 55° Fahrenheit and pressure 0.646 m. There are no means of keeping the temperature constant within the clock case, but the location of the clock in the basement of the meridian-circle house, and the protection of double doors to the clock room, result in slow periodic fluctuation only. The computed change of rate for the past five months is $-0^s.01$ per degree Fahrenheit and the application of this change reduces the average residual, for periods of about one week, from $\pm 0^s.08$ to $\pm 0^s.06$. While the case has been practically air-tight, the changes of temperature produce corresponding fluctuations in the pressure amounting to $+0.0014$ m. per degree Fahrenheit. The range of temperature in five months has been twenty degrees, while the average weekly change is about three degrees.

The Dent clock has also been rated, from the corrections by direct observations of the stars, simultaneously with those for the Riefler rate. Its rate was changed the first of August, by the addition of a small weight placed on the pendulum shelf. The present rate is $+0^s.91$ at temperature 70° Fahrenheit, and the change of rate, for the last five months, is $+0^s.03$ per degree, corresponding well to that determined from the rating of many previous years. The application of this change reduces the average residual for the past five months, in weekly periods, from $\pm 0^s.11$ to $\pm 0^s.06$. The temperature for this